

Change Topic: Document Baseline for User Community & Zero AOD User Interfaces

**Change Topic: Document Baseline for User Community & Zero AOD User Interfaces**

This change package accommodates the text changes to support the proposed solution (see table below) ICD-GPS-870, Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces. All comments must be submitted in Comments Resolution Matrix (CRM) form.

The columns in the WAS/IS table following this page are defined below:

Section Number: This number indicates the location of the text change within the document.

Proposed Heading: Contains existing and/or proposed changes to section titles and/or the titles to new sections

(WAS) <Document Title>: Contains the baseline text of the impacted document.

Proposed Object Text: Contains proposed changes to baseline text.

<b>PROBLEM STATEMENT:</b>
Raytheon's baseline CDR design for distribution of data across the User Community and Zero AOD User interfaces has not yet been defined. The current OCX ICD was written to capture the data types provided by this interface, but left the data distribution section based largely on the AEP-equivalent for the User Community interface, ICD-GPS-240. ICD-GPS-240 was written to reflect the in situ implementation for distribution of User Community products and is not appropriate to the broader set of OCX requirements.
<b>SOLUTION:</b> <i>(Proposed)</i>
Document the Raytheon baseline CDR design for the Public Release User Community interface.

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Section	Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces	Proposed Document Baseline for User Community & Zero AOD User Interfaces Changes
1.1	This Interface Control Document (ICD) defines the functional data transfer interface between the Global Positioning System (GPS) Control Segment (CS) and the GPS User and User-support communities for the GPS Next Generation Operational Control System (OCX). This ICD describes the data files that are transferred in this interface and the means by which these data files are distributed.	This Interface Control Document (ICD) defines the interface between the Global Positioning System (GPS) Control Segment (CS) and the GPS public User community during the GPS Next Generation Operational Control System (OCX) era . This ICD describes the GPS products and services provided by the CS and the means by which these GPS products are distributed.
1.1	The files that are generated by the GPS CS are: Almanacs (System Effectiveness Model (SEM), YUMA, and Extended Signals Health Status (ESHS)), Operational Advisories (OAs), Anti-Spoofing (A-S) Status, and Notice Advisory to Navstar Users (NANUs). The formats of these files are defined in the Appendices of this document. All data files transferred as described in this ICD are unclassified and are publicly releasable per the current GPS CS mode of operations and the 50 <sup>th</sup> SW Memorandum for Record - 2 SOPS GPS Public Release Policy.	All GPS products and tools transferred as described in this ICD are unclassified and are publicly releasable per the current GPS CS mode of operations and the 50 <sup>th</sup> SW Memorandum for Record - 2 SOPS GPS Public Release Policy.
1.1	In order to continue to support legacy Users who may not be able to update their code, the .alm (YUMA), .al3 (SEM), and as.txt (A-S Status) file formats are not changing and legacy Users are assured that they will continue to use these file types in the OCX era without changes to their systems. At the same time, the GPS CS does announce that it does not intend to make future updates to these file formats: .alm, .al3 and as.txt. The GPS CS encourages new Users and existing Users migrate to the newer file formats (.blm, .bl3, as2.txt), and in the future may propose to remove these legacy file formats in future updates to GPS CS. The GPS CS shall still be required to coordinate a specific timeframe or process in a public ICWG for the removal of a currently supported file formats.	In order to continue to support legacy Users who may not be able to update their code, the .alm (YUMA), .al3 (SEM), and as.txt (A-S Status) file formats are not changing and legacy Users are assured that they will continue to use these file types in the OCX era without changes to their systems. At the same time, the GPS CS does announce that it does not intend to make future updates to these file formats: .alm, .al3 and as.txt. The GPS CS encourages new Users and existing Users migrate to the newer file formats (.blm, .bl3, as2.txt or .XML), and in the future may propose to remove these legacy file formats in future updates to GPS CS. The GPS CS will still be required to coordinate a specific timeframe or process in a public ICWG for the removal of a currently supported file format.
1.1	The GPS CS is operated by the 2d Space Operations Squadron (2 SOPS), administratively organized under 50 <sup>th</sup> Space Wing (50 SW). The GPS User and User-support communities are comprised of the Department of Homeland Security (DHS) United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users; and various Military GPS Users. The interfaces between the GPS CS and the USCG, FAA, other Civil Users, and the Military GPS User community are implemented using electronic mail (e-mail), Internet and SIPRNet. This ICD does not include detailed technical descriptions of the e-mail system, Internet or SIPRNet.	The GPS CS is operated by the 2d Space Operations Squadron (2 SOPS), administratively organized under 50 <sup>th</sup> Space Wing (50 SW). The GPS User and User-support communities are comprised of the Department of Homeland Security (DHS) United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users; and various GPS Users. The interfaces between the GPS CS and the USCG, DOT, FAA, other Civil Users are implemented using electronic mail (e-mail) and the Internet. This ICD does not include detailed technical descriptions of the e-mail system or Internet.
1.2	<b>Key Events</b>	<b>Key Events and Transition Plans</b>
1.2	The major milestone for implementation of this interface is the initial operating capability of the GPS OCX system beginning with Effectivity 10 as defined in SS-CS-800.	The major milestone for implementation of this interface is the initial operating capability of the GPS OCX system beginning with Effectivity 10 as defined in SS-CS-800. 2 SOPS will prepare for and assess operational readiness of the new CS (ie OCX) prior to deactivating the legacy control segment (ie AEP) and declaring the new CS Ready-to-Operate (RTO).

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1.2		The following transition strategy will ensure a low risk migration of users from the AEP era interface (ICD-GPS-240) Web Site to the OCX era interface (ICD-GPS-870) Web Portal and then onward as future updates to OCX products and services are introduced;
1.2		a) The CS may introduce new products, services and standards, yet will provide a means for supporting backward compatibility.
1.2		b) New users and early adopters will be encouraged to adopt new products and features.
1.2		c) Existing products and services within the ICD which are planned for retirement will be deprecated prior to being retired thus providing advance warning for users to initiate and complete migration away from the deprecated products and services.
1.2		d) CS may (optionally) publish transition utilities to assist the user community in transitioning toward accommodating or adopting the new standards which are reflected in this interface. Users are encouraged to plan a migration to use the new GPS Products “as-is” and thus eliminate the need for transition utilities.
1.2		e) The GPS CS will still be required to coordinate a specific timeframe or process in a public ICWG for the removal of a currently supported product or service marking the end of the transition period.
1.2		The legacy AEP era Internet Web Site <a href="https://gps.afspc.af.mil/gps">https://gps.afspc.af.mil/gps</a> to the user community (ie ICD-GPS-240) will be manually maintained for a period of time not less than 6 <TBS> months following OCX being declared Ready-To-Operate, providing a transition window for users to migrate from using the legacy 2 SOPS web site to use the new CS Portal.
1.2		The CS selected a standards based approach to the GPS Products in order to minimize the impact to the user community during this transition. As a result, there is a wide variety of development COTS tools available to the users to independently develop tools to process the new GPS Products in their native (ie XML) formats. Government agencies are encouraged to work through the GPS Community of Interest (COI) POC for assistance during the transition.
2.1	<p><i>Federal</i> September 2008    Global Positioning System Standard Positioning Service Performance Standard</p> <p>July 2010        DoD IPv6 Standard Profiles For IPv6 Capable Products Version 5.0</p>	<p><i>Federal</i> September 2008    Global Positioning System Standard Positioning Service Performance Standard</p> <p>July 2010        DoD IPv6 Standard Profiles For IPv6 Capable Products Version 5.0</p>

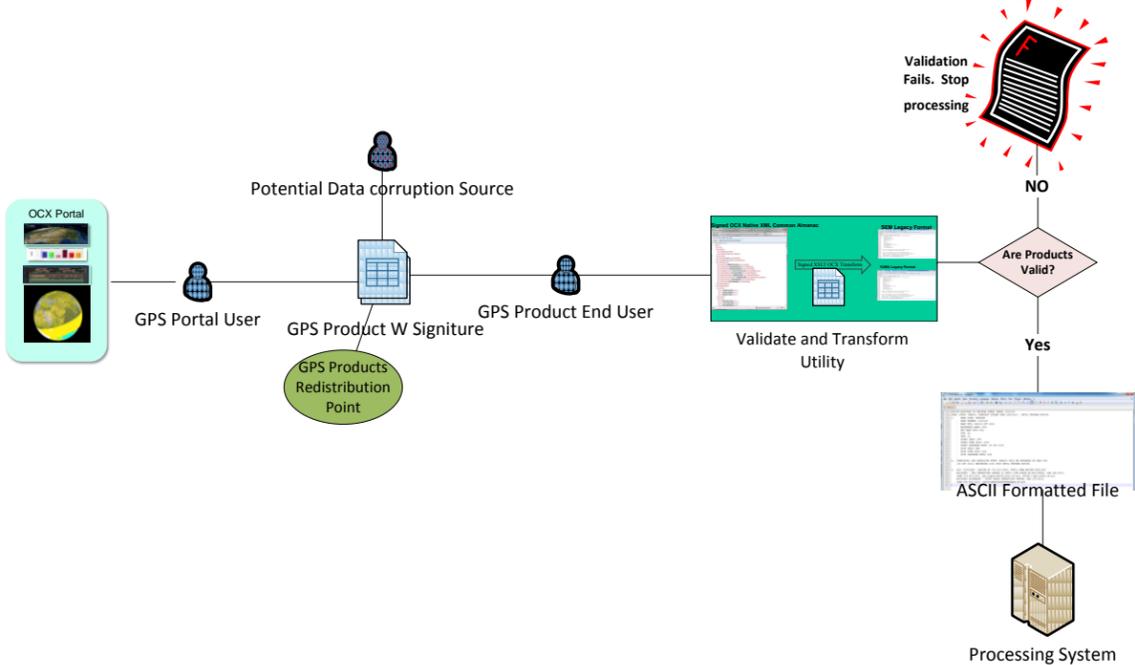
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	<p><i>Military</i> None</p>	<p><i>Military</i> 23 April 2007      DODD 8320.02 Data Sharing in a Net Centric Department of Defense</p> <p>July 2008      DoD Discovery Metadata Specification (DDMS) Version 2.0</p> <p>TBD      Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.</p>
2.1	<p>IS-GPS-200 Current Version      Navstar GPS Space Segment / Navigation User Interface</p> <p>IS-GPS-705 Current Version      Navstar GPS Space Segment / User Segment L5 Interfaces</p> <p>IS-GPS-800 Current Version      Navstar GPS Space Segment / User Segment L1C Interfaces</p> <p>GP-03-001A 20 April 2006      GPS Interface Control Working Group (ICWG) Charter</p> <p>MOA February 1992      Memorandum of Agreement Between the United States Coast Guard and the United States Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: USCG/G-NRN and USSPACECOM/DO)</p> <p>MOA February 1996      Support Agreement Between the United States Coast Guard and the United States Air Force Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: Commanding Officer NAVCEN and AFSPC/DO)</p>	<p>IS-GPS-200 Current Version      Navstar GPS Space Segment / Navigation User Interface</p> <p>IS-GPS-705 Current Version      Navstar GPS Space Segment / User Segment L5 Interfaces</p> <p>IS-GPS-800 Current Version      Navstar GPS Space Segment / User Segment L1C Interfaces</p> <p>GP-03-001A 20 April 2006      GPS Interface Control Working Group (ICWG) Charter</p> <p>MOA February 1992      Memorandum of Agreement Between the United States Coast Guard and the United States Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: USCG/G-NRN and USSPACECOM/DO)</p> <p>MOA February 1996      Support Agreement Between the United States Coast Guard and the United States Air Force Space Command, "Distribution of Navstar Global Positioning System (GPS) Status Information" (Signatories: Commanding Officer NAVCEN and AFSPC/DO)</p>

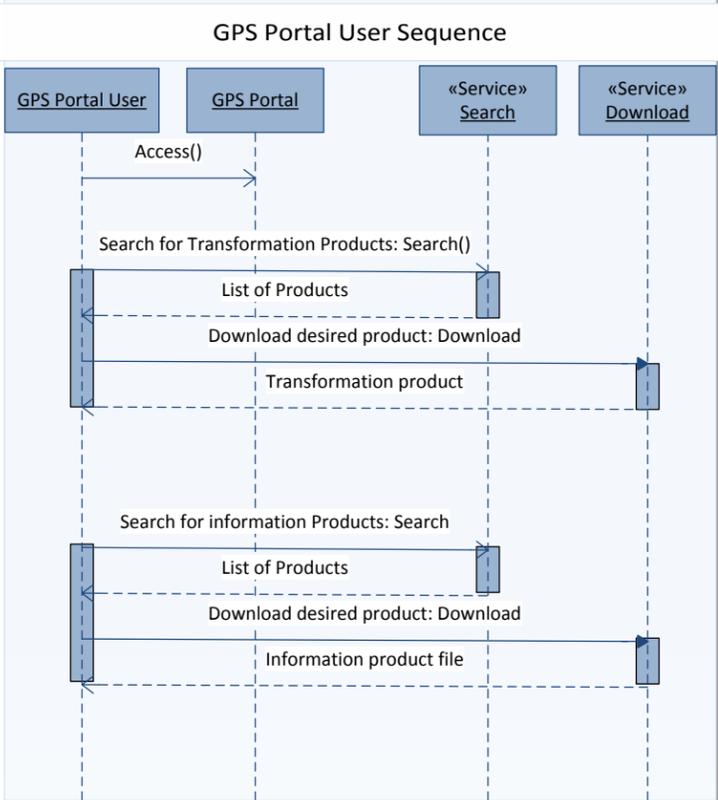
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	<p>MOA February 2010 Memorandum of Agreement between the Joint Functional Component Command for Space the U.S. Coast Guard Navigation Center and the FAA National Operations Control Center with respect to the Support of Users of the Navstar Global Positioning System</p> <p>Fiscal Year 2008 Federal Radionavigation Plan</p> <p>MFR June 30, 2011 Department of the Air Force, 50th Space Wing (AFSPC) Memorandum for Record - 2 SOPS GPS Public Release Policy</p>	<p>MOA February 2010 Memorandum of Agreement between the Joint Functional Component Command for Space the U.S. Coast Guard Navigation Center and the FAA National Operations Control Center with respect to the Support of Users of the Navstar Global Positioning System</p> <p>Fiscal Year 2008 Federal Radionavigation Plan</p> <p>MFR June 30, 2011 Department of the Air Force, 50th Space Wing (AFSPC) Memorandum for Record - 2 SOPS GPS Public Release Policy</p> <p>February 6, 2003 DODI 8500.2, Information Assurance (IA) Implementation</p> <p>TBD United States Department of Defense X.509 Certificate Policy</p>
2.2	<p><u>Standards</u> None</p>	<p><u>Standards</u></p> <p>November 1999 W3C, XSL Transformations (XSLT) Version 1.0</p> <p>November 2008 W3C, Extensible Markup Language (XML) Version 1.0 (Fifth Edition)</p> <p>June 2008 W3C, XML Signature Syntax and Processing (Second Edition)</p> <p>April 2006 IETF, RFC4346, The Transport Layer Security (TLS ) Protocol Version 1.1</p> <p>TBD IEFT, RFC 2616, Hypertext Transfer Protocol - HTTP/1.1</p>
3.1		<p>The CS shall provide a Web Portal accessible from the public Internet for securely distributing GPS products and services allowing Internet users with a standard web browser to interact with the GPS Portal.</p>
3.1		<p>Figure 3-1 depicts a generalized GPS Product Distribution Process which begins with a <b>GPS Portal User</b> interacting with the portal to retrieve the desired GPS Products. Then, the GPS Portal User re-distributes</p>

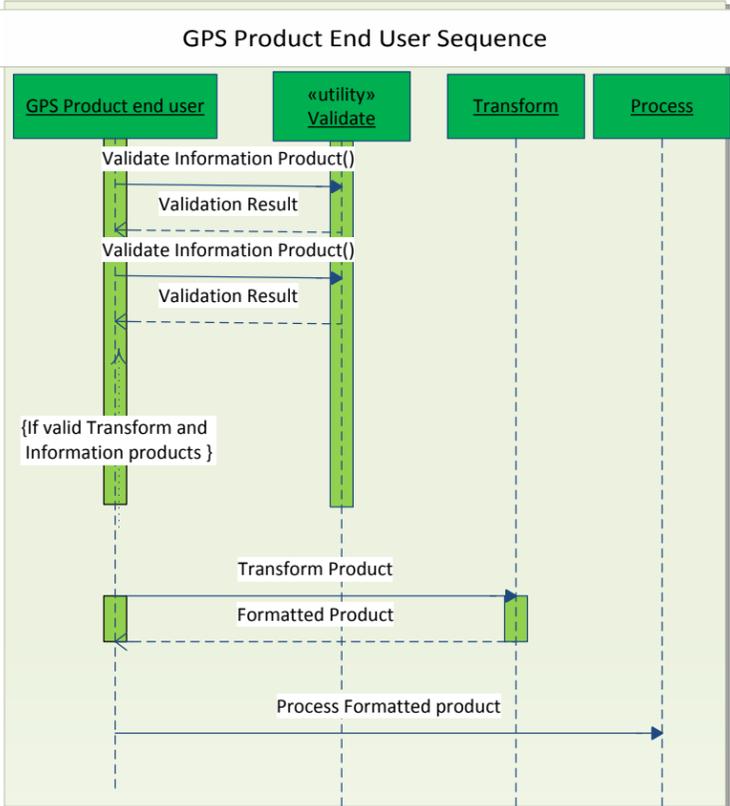
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		<p>the GPS products to a <b>GPS Product End-User</b> using a variety of means (e.g. local or shared storage, distribution media (e.g. CDs), e-mail, FTP, or a web site). The diagram reflects that a <b>potential data Corruption Source</b> actor may introduce data corruption at any time during this re-distribution process. The GPS Product End-User may then validate and/or transform the Information Product before use in a Processing System. The roles of <b>GPS Portal User</b>, <b>Potential Data Corruption Source</b> and <b>GPS Product End-User</b> may be performed by the same or by different individuals.</p>
3.1		Figure 3-1 Generic GPS Product Distribution Process
3.1		 <pre> graph LR     OCX[OCX Portal] --- GPUS[GPS Portal User]     GPUS --- GPSWS[GPS Product W Signature]     PDCS[Potential Data corruption Source] -.-&gt; GPSWS     GPSWS --- GPEU[GPS Product End User]     GPEU --- VUT[Validate and Transform Utility]     VUT --&gt; AV{Are Products Valid?}     AV -- NO --&gt; VFF[Validation Fails. Stop processing]     AV -- YES --&gt; ACF[ASCII Formatted File]     ACF --&gt; PS[Processing System]     </pre>
3.1		A GPS Portal User sequence diagram (see figure 3-2) is provided to further explain the intended use of the portal products and services.
3.1		<p>The GPS Portal shall provide the following services;</p> <ul style="list-style-type: none"> <li>a) Search - allows a user to search for GPS products based on search criteria (product type, textual, temporal). The GPS Portal retains all versions of GPS Product in on-line storage for a minimum of 30 days. The default temporal search criteria shall specify the “current” instance of a GPS product. The Results of the search shall be sorted displaying the most current products first.</li> </ul>

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		<p>b) View - allows a user to view a selected GPS product within the users Web browser in the CS native (ie XML) format.</p> <p>c) Download - allows a user to download a copy of a selected GPS product in the CS native format.</p>
3.1		Figure 3-2 GPS Portal User Sequence Diagram
3.1		 <pre> sequenceDiagram     participant User as GPS Portal User     participant Portal as GPS Portal     participant Search as «Service» Search     participant Download as «Service» Download      User-&gt;&gt;Portal: Access()     activate Portal     Portal-&gt;&gt;Search: Search for Transformation Products: Search()     activate Search     Search--&gt;&gt;User: List of Products     deactivate Search     User-&gt;&gt;Download: Download desired product: Download     activate Download     Download--&gt;&gt;User: Transformation product     deactivate Download     deactivate Portal      User-&gt;&gt;Search: Search for information Products: Search     activate Search     Search--&gt;&gt;User: List of Products     deactivate Search     User-&gt;&gt;Download: Download desired product: Download     activate Download     Download--&gt;&gt;User: Information product file     deactivate Download     deactivate Search     </pre>
3.1		<p>A GPS Product End-User sequence diagram (see figure 3-3) is provided to further explain the intended use of the Validate and Transform Utility provided by the CS. An overview of the activities performed by the GPS Product End User follows;</p> <p>a) Validate - an optional step performed by the end-user to ensure that the GPS Products have not been corrupted through the process of re-distribution</p>

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		<p>b) Transform - an optional step performed by end-users who may need information in legacy ASCII formats before processing</p> <p>c) Process - use the GPS Information typically ingesting files using an end-user Automated Information System (AIS)</p>
3.1		Figure 3-3 GPS Product End-User Sequence Diagram
3.1		 <p>The diagram, titled "GPS Product End User Sequence", shows the interaction between four lifelines: "GPS Product end user", "«utility» Validate", "Transform", and "Process".</p> <ul style="list-style-type: none"> <li>The "GPS Product end user" lifeline initiates the process by sending a "Validate Information Product()" message to the "«utility» Validate" lifeline.</li> <li>The "«utility» Validate" lifeline returns a "Validation Result" message to the "GPS Product end user".</li> <li>This sequence repeats once more.</li> <li>An activation bar on the "GPS Product end user" lifeline is annotated with the condition "{If valid Transform and Information products }".</li> <li>During this activation, the "GPS Product end user" sends a "Transform Product" message to the "Transform" lifeline.</li> <li>The "Transform" lifeline returns a "Formatted Product" message to the "GPS Product end user".</li> <li>Finally, the "GPS Product end user" sends a "Process Formatted product" message to the "Process" lifeline.</li> </ul>
3.1		<p>In accordance with DODD 8320, <i>Data Sharing in a Net Centric Department of Defense</i>, this ICD defines and then uses a GPS domain specific information exchange vocabulary which users should adopt when discussing the public GPS products and services offered by the CS. Figure 3-4 depicts a high level entity relationship diagram summarizing the GPS Portal Ontology.</p>
3.1		Figure 3-4 High Level GPS Portal Ontology

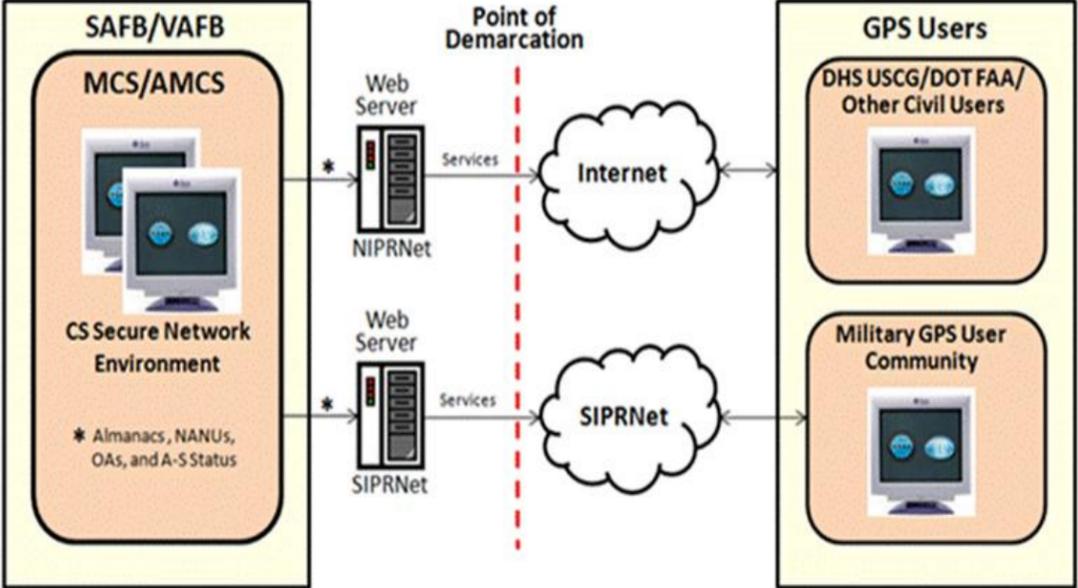
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3.1		<pre> classDiagram     class GPS_Portal {         +Access()     }     class Service_Download {         &lt;&lt;Service&gt;&gt;         +Download()     }     class Service_Search {         &lt;&lt;Service&gt;&gt;         +Search()     }     class Service_View {         &lt;&lt;Service&gt;&gt;     }     class Product_Meta_Data {     }     class GPS_Product {     }     class Digital_Signature {     }     class XML_Schema_Product {     }     class Information_Product {     }     class Transformation_Product {     }     class OA_Product {     }     class NANU_Product {     }     class Common_Almanac_Product {     }      GPS_Portal "1" *-- "*" GPS_Product     Service_Download ..&gt; GPS_Portal     Service_Search ..&gt; GPS_Portal     Service_View ..&gt; GPS_Portal     Product_Meta_Data "1" -- "1" GPS_Product     Digital_Signature "1" -- "1" GPS_Product     XML_Schema_Product ..&gt; Information_Product : «instance»     Information_Product &lt; -- OA_Product     Information_Product &lt; -- NANU_Product     Information_Product &lt; -- Common_Almanac_Product     Information_Product "1" -- "*" Transformation_Product     </pre>
3.1		<p>Appendices 1-5 of this ICD documents the minimum information content and formats which are required to achieve backward compatibility compliance. To also ensure compliance with DoD Information Technology Standards and Profile Registry (DISR) and enable rapid discovery, all published GPS Products will be defined using DoD Discovery Metadata Specification (DDMS) compliant meta data and XML compliant data schema. This meta data and schema will be published in the following locations; the GPS Portal itself and the Internet web site <a href="http://www.navcen.uscg.gov">http://www.navcen.uscg.gov</a>.</p>
3.1		<p>The CS will publish different kinds of GPS products including; Information Products, XML Schema Products and Transformation Products. Each GPS Product contain its respective Digital Signature and Product Meta data as shown in Figure 3-4 and Figure 3-6.</p>

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		<ul style="list-style-type: none"> <li>a) Information Products provide users information about the state/status of the GPS System.</li> <li>b) XML Schema Products define the structure of an XML document associated with this interface.</li> <li>b) Transformation Products can be used to transform an Information Product into one of several formats supporting full backward compatibility with legacy ASCII formats.</li> </ul>
3.1	<p>This ICD defines the interfaces between the Global Positioning System (GPS) Control Segment and the GPS User and User-support communities during the GPS Next Generation Operational Control System (OCX) era. The files provided by the GPS CS to these GPS Users are the Almanacs, Operational Advisories (OAs), Anti-Spoofing (A-S) Status, and the Notice Advisory to Navstar Users (NANUs) corresponding to all legacy signals and the new Civil signals L1C, L2C and L5. The GPS CS provides these data files to a TBD Web Server, residing outside of OCX, for further distribution. The primary means for distribution of the data that is generated by the GPS CS is via electronic mail (e-mail), Internet and SIPRNet.</p>	<p>The CS will publish different kinds of Information Products including ; Common Almanac (which now consolidates all previous constellation state/status information), Operational Advisories (OAs), and the Notice Advisory to Navstar Users (NANUs) corresponding to all legacy signals and the new Civil signals L1C, L2C and L5. The primary means for distribution of the data that is generated by the GPS CS is via electronic mail (e-mail) and an Internet facing GPS Portal.</p>
3.1	<p>Figure 1 captures the interfaces defined in this ICD. The point of demarcation separates the end Users from OCX and Department of Defense (DoD) systems that provide the files.</p>	<p>The CS shall provide a downloadable utility for users to validate data integrity and if required to transform an Information Product into backward compatible ASCII file formats (see Appendix 1-5).</p>
3.1		<p>This utility is provided to avoid the need for users to perform near term development prior to transition to the OCX RTO. Figure 3-5 depicts a high level entity relationship diagram summarizing the Validation and Transform Utility Ontology. Users are encouraged to plan a migration to use the new GPS Products in their native (ie XML) format and thus eliminate the need for this utility.</p>

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3.1	 <p>In OCX Block I, there will be an air gap between the GPS CS and the NIPRNet Web Server interface          In OCX Block II, the GPS CS to the Web Server interface will be automated, IAW the SS-CS-800**          The SIPRNet/NIPRNet servers are to be provided by the Government vice OCX  <b>NIPRNet Services:</b> Automatic NANU notification sent via e-mail and Almanacs, NANUs, OAs, and A-S Status files via Internet Website  <b>SIPRNet Services:</b> Almanacs, NANUs, OAs, and A-S Status files via SIPRNet Website          ** Cross Domain Solution: It allows operations across security domains (CS to Web Servers)</p>	Figure 3-5 Validate and Transform Utility Ontology

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3.1		<pre> classDiagram     class InformationProduct     class TransformationProduct     class Validate["«Service» Validate"]     class Transform["«Service» Transform"]     class ValidationError     class InvalidProducts{ }     class ValidProducts{ }     class ASCIIFormattedFile["ASCII Formatted File"]     class ASStatus["AS Status"]     class SEMAlmanac["SEM Almanac"]     class YumaAlmanac["Yuma Almanac"]     class NANU["NANU"]     class OAOA["OA"]     class ESHSFile["ESHS File"]     class ASStatusUpdated["AS Status (Updated)"]     class SEMAlmanacUpdated["SEM Almanac (Updated)"]     class YUMAAlmanacUpdated["YUMA Almanac (Updated)"]      InformationProduct ..&gt; TransformationProduct : &lt;&lt;uses&gt;&gt;     TransformationProduct ..&gt; InformationProduct : &lt;&lt;uses&gt;&gt;     Validate ..&gt; Transform : Results     Transform ..&gt; InvalidProducts : Invalid Products     Transform ..&gt; ValidProducts : Valid Products     ASCIIFormattedFile &lt; -- ASStatus     ASCIIFormattedFile &lt; -- SEMAlmanac     ASCIIFormattedFile &lt; -- YumaAlmanac     ASCIIFormattedFile &lt; -- NANU     ASCIIFormattedFile &lt; -- OAOA     ASCIIFormattedFile &lt; -- ESHSFile     ASStatusUpdated .. &gt; ASStatus     SEMAlmanacUpdated .. &gt; SEMAlmanac     YUMAAlmanacUpdated .. &gt; YumaAlmanac     </pre>
3.1	Figure 1 GPS CS to the GPS User Community	The CS public Internet facing OCX Web Portal is hosted on GFP provided Virtual platforms (STAX Service) within the Unclassified DoD DMZ at the DISA Defense Enterprise Computing Center (DECC) providing MAC II

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		public availability (as defined in DODI 8500.2).																																										
3.1	The interfaces defined in this ICD are listed in Table I, in the form of an information exchange matrix.	The interfaces defined in this ICD are listed in Table 3-I and Table 3-II, in the form of information exchange matrices.																																										
3.1		The GPS Portal publishes Information Products as shown in Table 3-I.																																										
3.1		These Information Products shall conform to the associated published XML schema Product as shown in Table 3-III.																																										
3.1		The GPS Portal shall publish Transition Utility and Support Products as shown in Table 3-II.																																										
3.1		Using the Information Products and provided Transformation Products as shown in Table 3-III, the Validate and Transform Utility shall allow the user to validate the digital signature of GPS Products.																																										
3.1		Given validated inputs, the Validate and Transform Utility shall produce the desired ASCII output as shown in Table 3-III.																																										
3.1		As shown in Table 3-III, the names of XML Schema Products and associated Transformation Products shall be appended with a revision number (ie _vx.y) where “x” indicates the major revision and “y” indicates a minor revision.																																										
3.1		Minor revisions shall be backward compatible within the same major revision.																																										
3.1	Table I Information Exchange Matrix	Table 3-I Information Product Information Exchange Matrix																																										
3.1	<table border="1"> <thead> <tr> <th>Producer</th> <th>Consumer</th> <th>Data Exchange Identification</th> <th>Information Description</th> <th>Nature of Transaction</th> <th>Security</th> </tr> </thead> <tbody> <tr> <td>GPS CS</td> <td>DHS USCG / DOT FAA/ Other Civil Users*</td> <td>GPS Status Information</td> <td>NANU</td> <td>Transmit via E-Mail and Post to Internet Website</td> <td>Unclassified</td> </tr> <tr> <td>GPS CS</td> <td>DHS USCG / DOT FAA/ Other Civil Users</td> <td>GPS Constellation Status Summary</td> <td>OA</td> <td>Post to Internet Website</td> <td>Unclassified</td> </tr> <tr> <td>GPS CS</td> <td>DHS USCG / DOT FAA/ Other Civil Users</td> <td>GPS Constellation Anti-Spoofing Status</td> <td>A-S Status</td> <td>Post to Internet Website</td> <td>Unclassified</td> </tr> </tbody> </table>	Producer	Consumer	Data Exchange Identification	Information Description	Nature of Transaction	Security	GPS CS	DHS USCG / DOT FAA/ Other Civil Users*	GPS Status Information	NANU	Transmit via E-Mail and Post to Internet Website	Unclassified	GPS CS	DHS USCG / DOT FAA/ Other Civil Users	GPS Constellation Status Summary	OA	Post to Internet Website	Unclassified	GPS CS	DHS USCG / DOT FAA/ Other Civil Users	GPS Constellation Anti-Spoofing Status	A-S Status	Post to Internet Website	Unclassified	<table border="1"> <thead> <tr> <th>Producer</th> <th>Consumer</th> <th>Data Exchange Identification</th> <th>Information Description</th> <th>Nature of Transaction</th> <th>Security</th> </tr> </thead> <tbody> <tr> <td>GPS CS</td> <td>DHS USCG / DOT FAA/ Other Civil Users*</td> <td>GPS Status Information</td> <td>Information Product: <b>NANU (see Table 3-III)</b></td> <td>Notification via E-Mail. Product available for download via Web Portal</td> <td>Unclassified Public Releasable Open Access</td> </tr> <tr> <td>GPS CS</td> <td>DHS USCG / DOT FAA/ Other Civil Users</td> <td>GPS Constellation Status Summary</td> <td>Information Product: <b>OA (See Table 3-III)</b></td> <td>Notification via E-Mail. Product available for download via Web Portal</td> <td>Unclassified Public Releasable Open Access</td> </tr> </tbody> </table>	Producer	Consumer	Data Exchange Identification	Information Description	Nature of Transaction	Security	GPS CS	DHS USCG / DOT FAA/ Other Civil Users*	GPS Status Information	Information Product: <b>NANU (see Table 3-III)</b>	Notification via E-Mail. Product available for download via Web Portal	Unclassified Public Releasable Open Access	GPS CS	DHS USCG / DOT FAA/ Other Civil Users	GPS Constellation Status Summary	Information Product: <b>OA (See Table 3-III)</b>	Notification via E-Mail. Product available for download via Web Portal	Unclassified Public Releasable Open Access
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Section	Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces						Proposed Document Baseline for User Community & Zero AOD User Interfaces Changes					
	GPS CS	DHS USCG / DOT FAA/ Other Civil Users	GPS Constellation Orbital and Performance Parameters, and SV Signal Health Status	Almanac	Post to Internet Website	Unclassified	GPS CS	DHS USCG / DOT FAA/ Other Civil Users	GPS Constellation Orbital and Performance Parameters, and SV Signal Health Status  GPS Constellation Anti-Spoofing Status	Information Product: <b>Common Almanac (See Table 3-III)</b>	Notification via E-Mail. Product available for download via Web Portal	Unclassified Public Releasable Open Access
GPS CS	Military User Community	GPS Status Information	NANU	Post to Internet and SIPRNet Websites	Unclassified							
GPS CS	Military User Community	GPS Constellation Status Summary	OA	Post to Internet and SIPRNet Websites	Unclassified							
GPS CS	Military User Community	GPS Constellation Anti-Spoofing Status	A-S Status	Post to Internet and SIPRNet Websites	Unclassified							
GPS CS	Military User Community	GPS Constellation Orbital and Performance Parameters, and SV Signal Health Status	Almanac	Post to Internet and SIPRNet Websites	Unclassified							
Note: * Automatic NANUs are also sent to other 2 SOPS approved GPS Users via e-mail						Table 3-II Transition & Support Product Exchange Matrix						
3.1												
3.1							<b>Producer</b>	<b>Consumer</b>	<b>Data Exchange Identification</b>	<b>Information Description</b>	<b>Nature of Transaction</b>	<b>Security</b>
							GPS CS	DHS USCG / DOT FAA/ Other Civil Users	XML Schema Definitions specifies content of each GPS Product	<b>XML Schema Products (See Table 3-III)</b>	Notification via E-Mail. Product available for download via Web Portal	Unclassified Public Releasable Open Access
							GPS CS	DHS USCG / DOT FAA/ Other Civil Users	XML Documents containing XSLT Transformations	<b>Transformation Products (See Table 3-III)</b>	Notification via E-Mail. Product available for download via Web Portal	Unclassified Public Releasable Open Access

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Section	Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces	Proposed Document Baseline for User Community & Zero AOD User Interfaces Changes					
		GPS CS	DHS USCG / DOT FAA/ Other Civil Users	Installable Application	<b>Validate and Transform Utility (see Table 3-III)</b>	Product available for download via Web Portal	Unclassified Public Releasable Open Access
3.1		Table 3-III Mapping Information Products & Transformation Products into Desired Output Format					
3.1		<b>Information Product Name</b>	<b>XML Schema Product Name</b>	<b>Transformation Product Name</b>	<b>Validation and Transform Utility Output</b>		
		NANU {time-stamp} Note: time-stamp when NANU was created formatted as Zulu time as YYYYMMDDHHMMSS	NANU XML Schema_vx.y	Legacy NANU Transform_vx.y	ASCII Formatted File:NANU File (default extension *.NNU)  See Appendix 1, Notice to Navstar Users Data Formats.		
		OA {time-stamp} Note: time-stamp when Ops Advisory was created formatted as YYYYMMDDHH	OA XML Schema_vx.y *	Legacy OA Transform_vx.y	ASCII Formatted File:OA File (default extension *.OA1). See Appendix 2, Operational Advisory Data File.		
		Common Almanac {GPS week : time of applicability}  Note: Non-modulo GPS week number : number of seconds since the beginning of the	Common Almanac XML Schema_vx.y	Legacy SEM AL3 Transform_vx.y  txt SEM BL3 Transform_vx.y	ASCII Formatted File:SEM Almanac File (default extension *.al3). See Appendix 3: Almanac Data Files  ASCII Formatted File:SEM Almanac File (default extension *.bl3). See Appendix 3, Almanac Data Files		

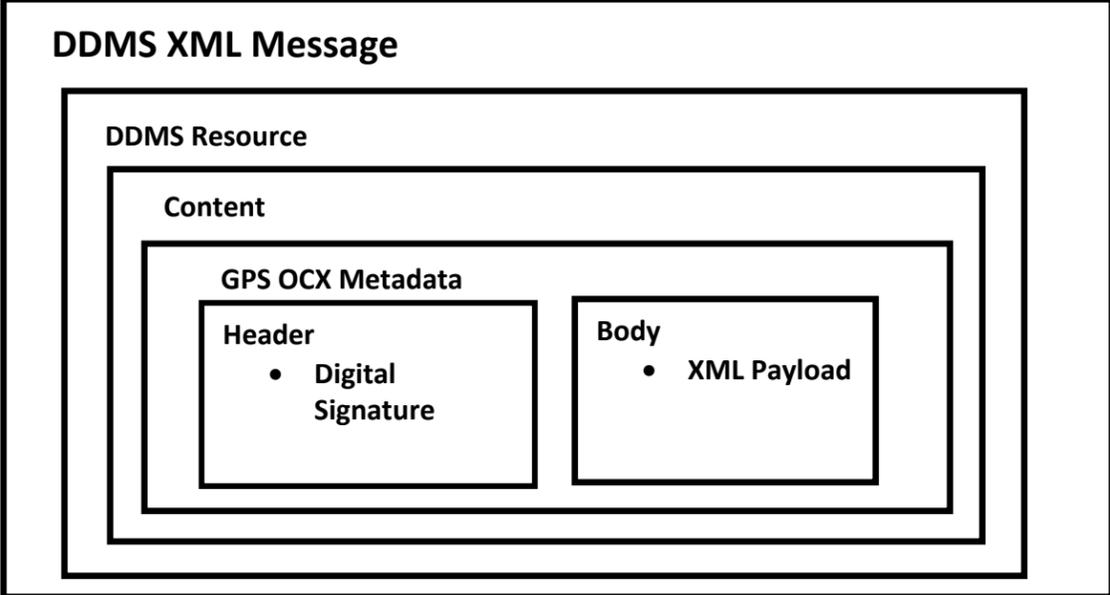
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		Almanac reference week.		Legacy YUMA ALM Transform_vx.y	ASCII Formatted File:Yuma Almanac File ( <i>default extension *.alm</i> ). See Appendix 3, Almanac Data Files
				Legacy YUMA BLM Transform_vx.y	ASCII Formatted File:Yuma Almanac File ( <i>default extension *.blm</i> ). See Appendix 3, Almanac Data Files
				Legacy ESHS ALE Transform_vx.y	ASCII Formatted File:ESHS File ( <i>default extension *.ale</i> ). See Appendix 4, Extended Signals Health Status Files
				Legacy AS Status AS Transform_vx.y	ASCII Formatted File:AS Status File ( <i>default extension *.txt</i> ). See Appendix 5, ANTI-SPOOFING STATUS FILE
				Legacy AS Status AS2 Transform_vx.y	ASCII Formatted File:AS Status File ( <i>default extension *.txt</i> ). See Appendix 5, ANTI-SPOOFING STATUS FILE
3.1		The CS shall be capable of publishing up to three major revisions of schema and transformations within the portal at any time to support backward compatibility and to extend the migration time for the user community.			
3.1		Note: Release of a new major schema revision is coordinated in advance with ICD signatories.			
3.1.32	The MCS, located at Schriever Air Force Base (SAFB), is the central control point for the GPS CS. For this interface, the MCS is responsible for generating the Almanacs, OAs, A-S Status and NANUs and providing these files to the GPS Users and User support community. The AMCS, located at Vandenberg AFB (VAFB), is functionally identical to the MCS; either MCS facility is capable of indefinite control of the GPS constellation. In case the MCS experiences downtime, the AMCS takes over this interface function. The term "MCS", as now used throughout this document, refers to either the MCS or the AMCS, whichever MCS facility actively controls the GPS constellation.	The MCS, located at Schriever Air Force Base (SAFB), is the central control point for the GPS CS. For this interface, the MCS is responsible for generating the Information Products in Table 3-I and providing these to the GPS Users and User support community. The AMCS, located at Vandenberg AFB (VAFB), is functionally identical to the MCS; either MCS facility is capable of indefinite control of the GPS constellation. In case the MCS experiences downtime, the AMCS takes over this interface function. The term "MCS", as now used throughout this document, refers to either the MCS or the AMCS, whichever MCS facility actively controls the GPS constellation.			

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Section	Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces	Proposed Document Baseline for User Community & Zero AOD User Interfaces Changes
3.1.32		The CS provides a modern secure web portal for distributing information using the public Internet. The portal allows users to search for GPS products. Transformations products are published to ensure backward compatibility by allowing users to create all legacy formats. Information products are available in CS native XML formats to improve both interoperability and information assurance. Users with a “.mil” or “.gov” e-mail address can receive a notification via e-mail when new products are published.
3.1.32		As depicted in Figure 3-6, all GPS Products available in the Portal shall comply with the following DISR standards: <ul style="list-style-type: none"> <li>• W3C, Extensible Markup Language (XML)</li> <li>• DoD Discovery Metadata Specification (DDMS)</li> <li>• X3C XML Signature Syntax and Processing Standard</li> </ul>
3.1.32		The transformation products which can be used to convert Information Products into the various ASCII formats have a body which shall comply with the following additional DISR standard: <ul style="list-style-type: none"> <li>• W3C, XSL Transformations (XSLT)</li> </ul>
3.1.32		These XSLT Transformation products are another kind of GPS Product in which the “XML Payload” is an XSLT-compliant document.
3.1.32		Figure 3-6 GPS Product Structure (XML native)

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3.1.32		 <p>The diagram illustrates the structure of a DDMS XML Message. It consists of several nested components:         <ul style="list-style-type: none"> <li><b>DDMS XML Message</b> (outermost container)</li> <li><b>DDMS Resource</b> (inner container)</li> <li><b>Content</b> (inner container)</li> <li><b>GPS OCX Metadata</b> (inner container, containing two sub-sections):             <ul style="list-style-type: none"> <li><b>Header</b>: Contains a <b>Digital Signature</b>.</li> <li><b>Body</b>: Contains an <b>XML Payload</b>.</li> </ul> </li> </ul> </p>
3.1.33	<p>The GPS User and User-support communities involve the Civil and Military GPS Users which are comprised of the Department of Homeland Security (DHS), United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users; and various Military GPS Users. These GPS Users are the recipients of the Almanac data, OAs, A-S Status and NANUs.</p>	<p>The GPS User and User-support communities involve the Civil Users which are comprised of the Department of Homeland Security (DHS), United States Coast Guard (USCG); Department of Transportation (DOT), Federal Aviation Administration (FAA); other Civil Users. These GPS Users are the recipients of the GPS Products.</p>
3.2	<p>The following subsections define the functional requirements and physical interface between the GPS CS and the DHS USCG, DOT FAA, other Civil Users, and the Military GPS User Community. For this interface, the GPS CS will communicate using Transmission Control Protocol/Internet Protocol (TCP/IP) communications protocol. This interface will also be IPv6 capable as defined by DoD IPv6 standard profile 5.0.</p>	<p>The following subsections define the functional requirements and physical interface between the GPS CS and the DHS USCG, DOT FAA, other Civil Users.</p>
3.2		<p>All Communications across this interface shall conform to the Transmission Control Protocol/Internet Protocol (TCP/IP) model standards.</p>
3.2		<p>All user (client) transport layer communications with the GPS Portal (server) shall be secured using the one-way Transport Layer Security (TLS) 1.1 standard</p>
3.2		<p>User web browser client shall communicate with the GPS Portal using Hypertext Transfer Protocol standard layered on top of the TLS (ie HTTPS).</p>
3.2.4	<p>The GPS CS generates the Almanac data for the GPS constellation, two current System Effectiveness Model (SEM)</p>	<p>The GPS CS generates the Common Almanac Information Product for the GPS constellation. The satellite</p>

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	<p>format Almanacs (current.al3 and current.bl3), two current YUMA format Almanacs (current.alm and current.blm), and one current Extended Signals Health Status (ESHS) format Almanac (current.ale). The satellite SEM and YUMA Almanac data contains orbital and performance parameters for operational GPS satellites. Detailed data formats of the SEM and YUMA Almanac data are described in Appendix 3 of this ICD. The satellite ESHS Almanac data contains the health status of each of the modernized civil signals available for each SV - L1C, L2C and L5. Detailed data formats of the ESHS Almanac data are described in Appendix 4 of this ICD.</p>	<p>Common Almanac contains orbital and performance parameters for operational GPS satellites, the health status of each of the modernized civil signals available for each SV - L1C, L2C and L5, as well as A-S status Information (see section 3.2.4). As shown in Table 3-III , two ASCII System Effectiveness Model (SEM) format Almanacs plus two ASCII YUMA format Almanacs and one ASCII Extended Signals Health Status (ESHS) format Almanac can be produced using the Common Almanac Information Product and provided transformation products. Detailed ASCII data formats of the SEM (current.al3 and current.bl3) and YUMA Almanac (current.alm and current.blm) data are described in Appendix 3 of this ICD. Detailed ASCII data formats of the ESHS Almanac data (current.ale) are described in Appendix 4 of this ICD.</p>
3.2.5	<p>The GPS CS generates the Operational Advisory data (current.oa1) for the GPS constellation. The OA data are descriptive summaries of GPS constellation status. Detailed data formats of the OA data are described in Appendix 2 of this ICD.</p>	<p>The GPS CS shall publish the Operational Advisory Information Product for the GPS constellation.</p>
3.2.5		<p>The OA data are descriptive summaries of GPS constellation status. As shown in Table 3-III, ASCII O-A formats can be produced using the O-A Information Product and the provided transformation product. Detailed ASCII data formats of the OA data file (current.oa1) are described in Appendix 2 of this ICD.</p>
3.2.6	<p>The GPS CS generates the NANU data file (current.nnu) for the GPS constellation. The NANU data are messages that inform Users of satellite outages and other GPS issues. Detailed data formats of the NANU data are described in Appendix 1 of this ICD.</p>	<p>The GPS CS shall publish the NANU Information Product for the GPS constellation.</p>
3.2.6		<p>The NANU Information Product are messages that inform Users of satellite outages and other GPS issues. As shown in Table 3-III, the ASCII formats can be produced using the NANU Information Product and the provided Transformation Product. Detailed ASCII data formats of the NANU (current.nnu) data are described in Appendix 1 of this ICD.</p>
3.2.7	<p><b>Generation of Anti-Spoofing Status</b></p>	<p><b>Generation of Anti-Spoofing (A-S) Status</b></p>
3.2.7	<p>The GPS CS generates the Anti-Spoofing Status files (as.txt and as2.txt) for the GPS constellation. The A-S Status informs Users whether the Anti-Spoofing mode of each GPS SV is ON or OFF. Detailed data format of the A-S Status are described in Appendix 5 of this ICD.</p>	<p>The GPS CS shall publish the Anti-Spoofing Status information for the GPS constellation as part of the Common Almanac Information Product.</p>
3.2.7		<p>The A-S Status informs Users whether the Anti-Spoofing mode of each GPS SV is ON or OFF. As shown in Table 3-III, the ASCII format of the A-S status can be produced using the Common Almanac Information Product and the provided Transformation Product. Detailed ASCII data format of the A-S Status files (as.txt and as2.txt) are described in Appendix 5 of this ICD.</p>

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3.2.8	The GPS CS provides the NANU, Operational Advisory, Anti-Spoofing Status, and Satellite Almanac files to a TBD Web Server for further distribution to the Military and Civil User Support Communities via electronic mail (e-mail), and Internet and SIPRNet websites. Sections 3.2.6 and 3.2.7 describe these interfaces.	The GPS CS provides the NANU, Operational Advisory, and Common Almanac (which now includes A-S Status information) Information Products to a Web Portal and for further distribution to the Civil User Support Communities via electronic mail (e-mail) notifications.
3.2.8		The CS public portal is intended for human users and there shall be no authentication required from Internet public Users (ie anonymous open access shall be applied to all public releasable products).
3.2.8		The CS public portal does not support Direct Machine-to-Machine exchange of GPS Products. A means (e.g. captcha) may optionally be employed by the CS to preclude attempts by users to establish machine-to-machine exchanges with the portal. US Government and Military Support users who require direct Machine-to-Machine access should refer to ICD-GPS-875 (FOUO) for details on how direct machine-to-machine information exchange is supported.
3.2.9	The GPS CS provides the NANU data file to a TBD Web Server for further distribution via automatic electronic mail (e-mail) distribution to an e-mail address provided by the USCG and FAA. Other 2 SOPS approved/authorized GPS Users also receive automatic NANUs.	The GPS CS provides the GPS Products (including NANU's) via the GPS Web Portal as well as providing optional notification via automatic electronic mail (e-mail) to a subscriber e-mail address provided by the USCG and FAA. Other 2 SOPS approved/authorized GPS Users also receive automatic notifications of new products (including NANUs).
3.2.9	The GPS CS uploads the NANU, Operational Advisory, Anti-Spoofing Status, and Satellite Almanac files to the Constellation Status page of the 2d Space Operations Squadron (2 SOPS) Internet secured website, <a href="https://gps.afspc.af.mil/gps">https://gps.afspc.af.mil/gps</a> , that is hosted on a TBD Web Server. NANU messages are transmitted whenever they are generated including weekends and holidays. The OA, A-S Status, and Almanac files are normally uploaded to the 2 SOPS Internet website once per day, 24/7, 365 days a year, prior to 1700 Zulu time (10 am MST, 11 am MDT). The USCG, FAA and other GPS Users, including Military Users and the general public, with Internet connectivity can access the 2 SOPS website and download these data files using Hypertext Transfer Protocol Secure (HTTPS).	The GPS CS uploads the NANU, Operational Advisory, and Common Almanac Information Products to the GPS Portal <a href="https://TBD">https://TBD</a> that is hosted within the DoD DMZ . NANU Information Products are transmitted whenever they are generated including weekends and holidays. The OA and Common Almanac Information Products are normally uploaded to the GPS Portal once per day, 24/7, 365 days a year, prior to 1700 Zulu time (10 am MST, 11 am MDT). The USCG, FAA and other GPS Users, and the general public, with Internet connectivity can access the GPS Portal and download these GPS Products using Hypertext Transfer Protocol Secure (HTTPS).
3.2.9		The CS portal shall provide the following user aids; user interface help information, points of contact, relevant external links and Frequently Asked Questions (FAQ).
3.2.10	<b>GPS MCS to Military GPS Users Interface</b>	<DELETED OBJECT>
3.2.10	The Military GPS Users with Internet connectivity can access the 2 SOPS secured Internet website and download NANU, Operational Advisory, Anti-Spoofing Status, and Satellite Almanac files as described in Section 3.2.6.	<DELETED OBJECT>
3.2.10	The GPS CS uploads the NANU, Operational Advisory, Anti-Spoofing Status, and Satellite Almanac files to the 2	<DELETED OBJECT>

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	SOPS SIPRNet website, that is hosted on a TBD Web Server, with the same frequency and timeline as for the Internet website as described in Section 3.2.6. Only authorized Military GPS Users with SIPRNet connectivity can download a NANU, OA, A-S Status, or Almanac data file using HTTPS.	
3.2.11	There is a data transfer interface between the CS and the United States NOTAM (Notice to Airmen) Office (USNOF) which is similar in content to the CS interface with the USCG and FAA. However, at this time, the CS to USNOF interface is defined and controlled by operational procedures and is not automated. Therefore, it is not included in this ICD. It is expected that a new automated interface between the CS and the USNOF will be added to this ICD in a future revision.	There is a data transfer interface between the CS and the United States NOTAM (Notice to Airmen) Office (USNOF) which is similar in content to the CS interface with the USCG and FAA. However, at this time, the CS to USNOF interface is defined and controlled by operational procedures and is not automated. Therefore, it is not included in this ICD. It is expected that a new automated (machine-to-machine) interface between the CS and the USNOF will be added to ICD-GPS-875 in a future revision.
3.3		<p>As the Authoritative Source for GPS Information, the CS publishes only digitally signed GPS Products to improve information assurance for GPS data at rest (ie resident on a storage device) within the GPS user community. Without digital signatures to ensure the integrity and proof-of-origin of the GPS Products at rest, Information Products originally from the CS could be corrupted (intentionally or unintentionally) after being downloaded from the GPS Portal without the knowledge of the CS or the end-user. The potential consequence of corrupted GPS Information products varies between end-users. Some end-users have Information Assurance critical applications (e.g. public utilities, safety-of-life systems) in which the potential consequence are significant and therefore unacceptable to the end-user. Therefore;</p> <ul style="list-style-type: none"> <li>a) The CS will only distribute GPS Products (see section 3.1.1) which are digitally signed XML documents per the published XML schema for compliance with modern Net Centric and Information Assurance standards for non-repudiation.</li> <li>b) The CS publishes Transformation Products and also provides a downloadable Validate and Transform Utility to assist users with first validating then transforming Information Products into backward compatible ASCII formats.</li> <li>c) In order to maximize the benefit of information assurance, the CS recommends that End-Users perform the transformation step as late as possible (just prior to ingesting).</li> <li>d) Validating the data integrity of GPS products is optional and is the responsibility of the user. End-users must apply their knowledge of the critically of their application in making the determination of whether they can accept the risks of ignoring CS provided digital signatures.</li> <li>e) The CS strongly recommends that any US government “re-distribution node” (a US government user which re-distributes or derives and then distributes GPS information to a constituent sub-set of the GPS user community on the Internet) only re-distribute information products which can be validated (both in terms of proof-of-origin from the authoritative source and so as to ensure information content has not been compromised) in order to; (1) avoid</li> </ul>

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Section	Navstar Next Generation GPS Operational Control Segment (OCX) to User Support Community Interfaces	Proposed Document Baseline for User Community & Zero AOD User Interfaces Changes
		<p>introducing confusion within the GPS user community as to which government publisher is the authoritative source for GPS Information Products (2) improve GPS data integrity for GPS Users. A US government re-distribution node can comply with this recommendation by only Re-distributing CS provided GPS Products “as-is” and NOT publishing the unsigned ASCII formatted files.</p>
3.3	<p>Those consumers not interested in verifying the data integrity of messages (NANUs, OAs, A-S status files, Almanacs, and ESHSs) can simply just use the messages. The requirement is upon the GPS CS to provide data integrity and it is OPTIONAL for the consumer to take the steps needed to verify the integrity of the data. The following paragraphs describe what the GPS CS is required to do and optionally what the consumer would need to do to verify that a message is genuine and originates from the GPS CS.</p>	<p>Those consumers not interested in verifying the data integrity of Information Products can simply use the messages. The requirement is upon the GPS CS to provide data integrity and it is OPTIONAL for the consumer to take the steps needed to verify the integrity of the data. The following paragraphs describe what the GPS CS is required to do and optionally what the consumer would need to do to verify that a message is genuine and originates from the GPS CS.</p>
3.3	<p>The GPS CS shall use DoD Public Key Infrastructure (PKI) to digitally sign all messages (NANUs, OAs, A-S status files, Almanacs, and ESHSs) as per Department of Defense Public Key Infrastructure Functional Interface Specification 3.0. Digital signatures shall use the Rivest-Shamir-Adleman (RSA) public key algorithm with 2048 bit keys and Secure Hash Algorithm-256 (SHA-256) for signatures.</p>	<p>The GPS CS shall use DoD Public Key Infrastructure (PKI) to digitally sign all GPS Products as described in section 3.3.1 and as per Department of Defense Public Key Infrastructure Functional Interface Specification 3.0.</p>
3.3		<p>Digital signatures shall use the Rivest-Shamir-Adleman (RSA) public key algorithm with 2048 bit keys and Secure Hash Algorithm-256 (SHA-256) for signatures.</p>
3.3		<p>As depicted in Figure 3-6, the header elements of the GPS Product Meta Data will contain the XML digital signature for the <b>entire</b> GPS Product (excluding the signature itself). This method of digital signing is referred to as an enveloped signature as defined in the W3C Signature Syntax Processing.</p>
3.3		<p>As shown in Figure 3-3, the steps for a user to verify the data integrity where the user has a legacy application which directly processes ASCII file formats:</p> <ol style="list-style-type: none"> <li>1. Use the GPS Portal to download the desired Information Product and Transform Product (see Table 3-III). Note: Because the XML schema for an Information Product will change very infrequently, a Transformation Product can be downloaded once for a new schema revision and then reused repeatedly without re-downloading.</li> <li>2. Just prior to use, Validate the Digital Signature of Information Product and the Transform Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g., JDK 1.6/1.7) and the currently published CS public key at <a href="http://dodpki.c3pki.chamb.disa.mil/">http://dodpki.c3pki.chamb.disa.mil/</a>.</li> </ol>

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		<p>3. If the signatures do not validate in Step 2, then either the Information Product or the Transformation Product is not authentic (not produced by the CS) or has been corrupted. Do not use. The user should return to step 1.</p> <p>4. If the signatures validate in both Step 2 and Step 3, then extract XSLT from the Product Meta Data Body Element (see Figure 3-4) and apply the XSLT using standard COTS/Library to produce the desired ASCII file format.</p> <p>Note: A user with a legacy non-critical application who intends to bypass verifying data integrity only needs to perform Step 1 and then Step 4.</p> <p>Note: The provided Validate and Transform Utility (see figure 3-5) can be used to perform steps 2, 3 and 4. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.</p>
3.3		<p>As shown in Figure 3-3, the steps for a user to verify the data integrity where the user has a modern application which directly processing CS native XML formats;</p> <ol style="list-style-type: none"> <li>1. Use the GPS Portal to download the desired Information Product (see Table 3-III)</li> <li>2. Just prior to use, Validate the Digital Signature of Information Product using a W3C XML Digital Signature Compliant standard COTS/Library (e.g. JDK 1.6/1.7) and the currently published CS public key at <a href="http://dodpki.c3pki.chamb.disa.mil/">http://dodpki.c3pki.chamb.disa.mil/</a>.</li> <li>3. If the signature does not validate in Step 2, then the Information product is either not authentic (not produced by the CS) or the information content has been corrupted. Do not use. The user should return to step 1.</li> <li>4. If the signature validates in Step 2, then the GPS Product is authentic and the content has</li> </ol>

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		<p>not been corrupted.</p> <p>Note: A user with a modern non-critical application who intends to bypass verifying data integrity only needs to perform Step 1</p> <p>Note: The provided Validate and Transform Utility (see figure 3-5) can be used to perform step 2. The user is required to download/install the CS public key on their system prior to using the Validate and Download Utility.</p>
3.3	The GPS CS unclassified certificate (and corresponding public key) shall be made available to all consumers for data integrity verification and source authentication. DoD PKI root certificates are available on the DoD Class 3 Public Key Infrastructure (PKI) website, <a href="http://dodpki.c3pki.chamb.disa.mil/">http://dodpki.c3pki.chamb.disa.mil/</a> , to verify the certificate chain.	The GPS CS unclassified certificate (and corresponding CS public key) shall be made available to all consumers for data integrity verification and source authentication.
3.3		DoD PKI root certificates are available on the DoD Class 3 Public Key Infrastructure (PKI) website, <a href="http://dodpki.c3pki.chamb.disa.mil">http://dodpki.c3pki.chamb.disa.mil</a> , to verify the certificate chain.
3.3		To encourage GPS users to validate data integrity and at the same time ensure backward compatibility to legacy ASCII files, the CS portal shall provide a link to downloadable transition support utility application referred to herein as “ <i>Validate and Transform Utility</i> ”.
3.3		This utility will present the user with a simple User Interface to validate the integrity of any downloaded GPS Product and to optionally apply the transform contained within a downloaded Transformation Product . The provided Utility will be installable on supported Windows, Linux platforms. The Utility will be digitally signed and users should validate the Authenticity of the certificate during installation.
3.3.9	<b>GPS CS to GPS User Support Community data distribution via web site</b>	<b>Digital Signatures</b>
3.3.9	As all the messages in this interface are unclassified, the GPS CS shall make all the messages and associated digital signatures available to the public without requiring authentication of the consumer. A signature shall be persistent and on the message itself (i.e., not tied to a transport protocol or session). A message shall always have its corresponding signature available to the consumer to verify the message independent of the delivery protocol.	As all the GPS Products distributed over this interface are unclassified and public releasable, the GPS CS shall make all digitally signed GPS Products available to the public without requiring authentication of the consumer.
3.3.9		The CS digital signature shall be persistent and embedded within GPS Product itself (i.e., not tied to a transport protocol or session) to provide integrity for data at rest.

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3.3.9		A message shall always have its corresponding signature available to the consumer to verify the message independent of the delivery protocol.
3.3.10		The CS shall allow the Web Portal administrator to manage a list of current subscribers to any of the GPS products.
3.3.10		The CS shall provide a means for users to request the Web Portal Administrator via e-mail to create new subscriptions or to cancel existing subscriptions for a GPS product.
3.3.10		NOTE: Web Portal administrator will only process user requests with a valid e-mail address domain of *.mil or *.gov .
3.3.10		In order to allow users a method to easily cancel obsolete subscriptions, the CS generated notification e-mail messages shall contain a UNSUBSCRIBE hyperlink which initiates an e-mail request to the Web Portal administrator to cancel the subscription.
3.3.10	When first applying to receive data via automated interface, individuals may be required to provide some information prior to being added to receive automated distribution. For example, those who do not have an email address ending in .mil, might be referred to NAVCEN to get on their automated data distribution. After approval from the registration process, no further authentication activities are performed.	When initiating a new subscription for a GPS Product, individuals may be required to provide some information prior to being added to receive automated distribution. For example, those who do not have an email address ending in .mil, might be referred to NAVCEN to get on their automated data distribution. After approval from the registration process, no further authentication activities are performed.
3.3.10	As all the messages in this interface are unclassified, after registration, the GPS CS shall automatically attempt to deliver messages and associated digital signatures the consumer has registered for without authenticating the consumer when delivery is attempted. If delivery is via email, the signature shall be on the message and not dependent on the email such that the extracted signature can be used to validate the extracted message without the whole email.	When the CS publishes a new product to the GPS Portal which has current subscribers, the GPS CS shall automatically attempt to deliver a notification e-mail message to each subscriber.
3.3.10		The notification e-mail message will include Product Meta Data as well as a hyperlink to the newly published GPS Product. If the user clicks on the product hyperlink, the new Product Meta Data is viewed within the GPS Portal.

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10.1.1	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYJJJ  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE SUMMARY JDAY JJJ/HHHH - UFN</p> <ol style="list-style-type: none"> <li>NANU TYPE: FCSTUUFN  NANU NUMBER: YYYYSSS  NANU DTG: HHHHDDZ MMM YYYY  SVN: XXX  PRN: XX  START JDAY: JJJ  START TIME ZULU: HHHH  START CALENDAR DATE: DD MMM YYYY</li> <li>CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE ON JDAY 211 (30 JUL 2009) BEGINNING 0915 ZULU UNTIL FURTHER NOTICE.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) FORECAST OUTAGE JDAY JJJ/HHMM - UNTIL FURTHER NOTICE</p> <ol style="list-style-type: none"> <li>NANU TYPE: FCSTUUFN  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  REFERENCE NANU: N/A  REF NANU DTG: N/A  SVN: XXX  PRN: XX  START JDAY: JJJ  START TIME ZULU: HHMM  START CALENDAR DATE: DD MMM YYYY  STOP JDAY: UFN  STOP TIME ZULU: N/A  STOP CALENDAR DATE: N/A</li> <li>CONDITION: GPS SATELLITE SVNXXX (PRNXX) WILL BE UNUSABLE NO EARLIER THAN JDAY JJJ (DD MMM YYYY) BEGINNING HHMM ZULU UNTIL FURTHER NOTICE.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>
10.1.4	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) LAUNCH JDAY JJJ</p> <ol style="list-style-type: none"> <li>NANU TYPE: LAUNCH  NANU NUMBER: YYYYSSS  NANU DTG: HHHHDDZ MMM 2007  SVN: XXX  PRN: XX  LAUNCH JDAY: JJJ  LAUNCH TIME ZULU: HHHH</li> <li>GPS SATELLITE SVN XXX (PRN XX) WAS LAUNCHED ON JDAY JJJ A USABINIT NANU WILL BE SENT WHEN THE SATELLITE IS SET ACTIVE TO SERVICE.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) LAUNCH JDAY JJJ</p> <ol style="list-style-type: none"> <li>NANU TYPE: LAUNCH  NANU NUMBER: YYYYSSS  NANU DTG: DDHMMZ MMM YYYY  SVN: XXX  PRN: XX  LAUNCH JDAY: JJJ  LAUNCH TIME ZULU: HHMM</li> <li>GPS SATELLITE SVN XXX (PRN XX) WAS LAUNCHED ON JDAY JJJ A USABINIT NANU WILL BE SENT WHEN THE SATELLITE IS SET ACTIVE TO SERVICE.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>

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10.1.4	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYJJJ  SUBJ: SVNXXX (PRNXX) DECOMMISSIONING JDAY JJJ/HHHH</p> <ol style="list-style-type: none"> <li>NANU TYPE: DECOMM  NANU NUMBER: YYYYSSS  NANU DTG: HHHHDDZ MMM YYYY  REFERENCE NANU: YYYYSSS  REF NANU DTG: HHHHDDZ MMM YYYY  SVN: XXX  PRN: XX  UNUSABLE START JDAY: JJJ  UNUSABLE START TIME ZULU: HHHH  UNUSABLE START CALENDAR DATE: DD MMM YYYY  DECOMMISSIONING START JDAY: JJJ  DECOMMISSIONING START TIME ZULU: HHHH  DECOMMISSIONING START CALENDAR DATE: DD MMM YYYY</li> <li>CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE AS OF JDAY JJJ (DD MMM YYYY) AND REMOVED FROM THE GPS CONSTELLATION ON JDAY JJJ (DD MMM YYYY) AT HHHH ZULU.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>	<p>NOTICE ADVISORY TO NAVSTAR USERS (NANU) YYYYSSS  SUBJ: SVNXXX (PRNXX) DECOMMISSIONING JDAY JJJ/HHMM</p> <ol style="list-style-type: none"> <li>NANU TYPE: DECOM  NANU NUMBER: YYYYSSS  NANU DTG: DDHHMMZ MMM YYYY  REFERENCE NANU: YYYYSSS  REF NANU DTG: DDHHMMZ MMM YYYY  SVN: XXX  PRN: XX  UNUSABLE START JDAY: JJJ  UNUSABLE START TIME ZULU: HHMM  UNUSABLE START CALENDAR DATE: DD MMM YYYY  DECOMMISSIONING START JDAY: JJJ  DECOMMISSIONING START TIME ZULU: HHMM  DECOMMISSIONING START CALENDAR DATE: DD MMM YYYY</li> <li>CONDITION: GPS SATELLITE SVNXXX (PRNXX) WAS UNUSABLE AS OF JDAY JJJ (DD MMM YYYY) AND REMOVED FROM THE GPS CONSTELLATION ON JDAY JJJ (DD MMM YYYY) AT HHMM ZULU.</li> <li>POC: CIVILIAN - NAVCEN AT 703-313-5900, <a href="http://www.navcen.uscg.gov">HTTP://WWW.NAVCEN.USCG.GOV</a>  CIVIL AVIATION - FAA National Operations Control Center  MILITARY - GPS Support Center at <a href="https://gps.afspc.af.mil/gpsoc">HTTPS://GPS.AFSPC.AF.MIL/GPSOC</a>, DSN 560-2541,  COMM 719-567-2493, <a href="mailto:GPS_SUPPORT@SCHRIEVER.AF.MIL">GPS_SUPPORT@SCHRIEVER.AF.MIL</a>, <a href="http://www.schriever.af.mil/gps">HTTP://WWW.SCHRIEVER.AF.MIL/GPS</a>  MILITARY ALTERNATE - JOINT SPACE OPERATIONS CENTER, DSN 276-9994.  COMM 805-606-9994, <a href="mailto:JSPOCCOMBATOPS@VANDENBERG.AF.MIL">JSPOCCOMBATOPS@VANDENBERG.AF.MIL</a></li> </ol>																																																																																																																
30.4	<p>The SEM format file example in Figure 30-1 is arranged with a header that identifies the number of records (number of satellites) and file name (current.al3). The SEM Almanac sample illustrated below is a data sample of one record out of 28 in this sample file and its parameter definition, as stated in the note of Figure 30-1, is in Table 30-II. There is an additional SEM file with a file name extension of .bl3 that is identical to .al3, except for the number of records range, PRN number range and SVN number field. All parameters are listed in Table 30-III.</p>	<p>The SEM format file example in Figure 30-1 is arranged with a header that identifies the number of records (number of satellites) and file name (current.al3). The SEM Almanac sample illustrated below is a data sample of one record out of 28 in this sample file and its parameter definition, as stated in the note of Figure 30-1, is in Table 30-II. There is an additional SEM file with a file name extension of .bl3 that is identical to .al3, except for the number of records range, PRN number range and SVN number field. All parameters are listed in Table 30-III.</p>																																																																																																																
4.0	<p>Verification Change Requirements Matrix</p> <table border="1" data-bbox="366 1421 1634 1790"> <thead> <tr> <th>ID</th> <th>Object Number</th> <th>CS Effectivity</th> <th>SS Effectivity</th> <th>Highest Verification Level</th> <th>Segment</th> <th>System Verification Method</th> </tr> </thead> <tbody> <tr><td>ICD870-651</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-656</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-671</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-672</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-673</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-674</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> <tr><td>ICD870-675</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td><td>&lt;INSERTED&gt;</td></tr> </tbody> </table>	ID	Object Number	CS Effectivity	SS Effectivity	Highest Verification Level	Segment	System Verification Method	ICD870-651	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-656	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-671	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-672	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-673	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-674	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	ICD870-675	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<INSERTED>	<p>Verification Change Requirements Matrix</p> <table border="1" data-bbox="1700 1421 2915 1802"> <thead> <tr> <th>ID</th> <th>Object Number</th> <th>CS Effectivity</th> <th>SS Effectivity</th> <th>Highest Verification Level</th> <th>Segment</th> <th>System Verification Method</th> </tr> </thead> <tbody> <tr><td>ICD870-651</td><td>3.1.1</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-656</td><td>3.1.6</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-671</td><td>3.1.20</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-672</td><td>3.1.21</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-673</td><td>3.1.22</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-674</td><td>3.1.23</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> <tr><td>ICD870-675</td><td>3.1.24</td><td>10</td><td>N/A</td><td>Segment</td><td>CS</td><td>N/A</td></tr> </tbody> </table>	ID	Object Number	CS Effectivity	SS Effectivity	Highest Verification Level	Segment	System Verification Method	ICD870-651	3.1.1	10	N/A	Segment	CS	N/A	ICD870-656	3.1.6	10	N/A	Segment	CS	N/A	ICD870-671	3.1.20	10	N/A	Segment	CS	N/A	ICD870-672	3.1.21	10	N/A	Segment	CS	N/A	ICD870-673	3.1.22	10	N/A	Segment	CS	N/A	ICD870-674	3.1.23	10	N/A	Segment	CS	N/A	ICD870-675	3.1.24	10	N/A	Segment	CS	N/A
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